



SLOVENSKI STANDARD

SIST EN 2516:2001

01-januar-2001

Aerospace series - Passivation of corrosion resisting steels and decontamination of nickel base alloys

Aerospace series - Passivation of corrosion resisting steels and decontamination of nickel base alloys

Luft- und Raumfahrt - Passivieren von korrosionsbeständigen Stählen und Dekontaminierung von Nickellegierungen

Série aérospatiale - Passivation des aciers résistant a la corrosion et décontamination des alliages base nickel

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Ta slovenski standard je istoveten z: EN 2516:1997

ICS:

49.040	Preveleke in z njimi povezani postopki, ki se uporabljajo v letalski in vesoljski industriji	Coatings and related processes used in aerospace industry
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EUROPEAN STANDARD

EN 2516

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 1997

ICS 49.040.40

Descriptors: aircraft industry, steels, corrosion resisting steels, contamination, nickel alloys, classifications, degreasing, characteristics, inspection, quality assurance, designation

English version

**Aerospace series - Passivation of corrosion
resisting steels and decontamination of nickel
base alloys**

Série aérospatiale - Passivation des aciers
résistant à la corrosion et décontamination des
alliages base nickel

Luft- und Raumfahrt - Passivieren von
korrosionbeständigen Stählen und
Dekontaminierung von Nickellegierungen

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 1997, and conflicting national standards shall be withdrawn at the latest by September 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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PREVENT TO METEORIC IMPACTS



1 Scope

This standard specifies several chemical methods of passivation ¹⁾ for corrosion resisting steels (austenitic, ferritic, martensitic and precipitation hardenable) and of decontamination for nickel base alloys.

2 Purpose of process

To improve the corrosion resistant characteristics of a part after such treatments as machining, forming, tumbling and shot peening by removing foreign metal contamination due to these operations

Passivation shall not be used on castings, welded or brazed parts, carburized or nitrided surfaces nor on parts with mating surfaces when entrapment of acids may occur.

3 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 9227 Corrosion tests in artificial atmospheres - Salt spray tests

EN 2000 Aerospace series - Quality assurance - EN aerospace products - Approval of the quality system of manufacturers

EN 2032-1 Aerospace series - Metallic materials - Part 1: Designation 2)

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4 Classification

The process class to be used depending on the material type is given in table 1, unless otherwise specified between the manufacturer and the purchaser.

The designation of the material type is defined in EN 2032-1.

1) Other processes (e.g. electrolytic polishing) can also produce passivated surfaces.

2) Published as AECMA Prestandard at the date of publication of this standard

Table 1

Material type and designation	Process class
Austenitic chromium-nickel steels and austenitic-ferritic steels FE-PA36XX, FE-PA39XX, FE-PA45XX, FE-PA47XX, FE-PA48XX, FE-PA49XX, FE-PA15XX	C1 or C2
Ferritic and martensitic chromium steels FE-PM15XX, FE-PM17XX, FE-PM19XX	C4
Austenitic precipitation hardenable steels FE-PA26XX, FE-PA29XX, FE-PA25XX	C1
Martensitic precipitation hardenable steels FE-PM27XX, FE-PM38XX, FE-PM35XX	C4
High chromium martensitic steels FE-PM39XX	C3
Heat resisting nickel base alloys NI-PH13XX, NI-PH18XX, NI-PH23XX, NI-PH29XX, NI-PD73XX, NI-PH26XX	C1 or C2

5 Information for the processor

- Designation, see 12 ;
- reference of the material standard and metallurgical condition of the latter ;
- sequence of operations, if necessary ;
- areas to be processed.

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6 Condition of the parts prior to processing

Fabrication of the parts shall have been completed.

7 Pre-treatments

The parts shall be submitted to one or more of the processes (7.1 to 7.4) appropriate to their degree of contamination. These processes are given for guidance. Other methods giving at least equivalent results may be applied.

Unless otherwise specified, parts shall be processed from one step to the next without delay.

7.1 Degreasing

7.1.1 Organic solvents

Approved products shall be used either cold in liquid state or hot in vapour state.

7.1.2 Alkaline solutions

a) Degreasing in strong alkaline solutions

The composition may be as follows :

- sodium hydroxide (NaOH) : 15 g/l
- sodium metasilicate pentahydrate ($\text{Na}_2\text{SiO}_3 \cdot 5\text{H}_2\text{O}$) : 40 g/l

b) Degreasing in mild alkaline solutions

The composition may be as follows :

- sodium metasilicate pentahydrate : 25 g/l
- sodium carbonate (Na_2CO_3) : 25 g/l

Addition of a wetting agent is possible.

These solutions shall be used for immersion degreasing either anodically or not.

7.2 Abrasive cleaning

a) Blasting

Use a fine-grain alumina or glass beads with or without water.

b) Tumbling

The abrasives shall not have been used on any other type of material (see table 1) except titanium base alloys.

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7.3 Descaling

The method shall be chosen according to the type of parts, heat treatment or hot forming.

7.4 Acid-pickling

It shall only be used on steels not susceptible to pitting or sensitive to intergranular corrosion by the pickling solution which is most frequently an aqueous solution of nitric and hydrofluoric acids. The concentration can be adjusted within very wide limits by varying the proportions of the ingredients and by adjusting operating temperatures.

Parts in steel of R_m (max.) > 1 100 MPa 3) shall be de-embrittled by heat treatment at 190 °C to 230 °C for at least 1 h.

3) R_m (max.) = maximum specified R_m

8 Treatment

The aqueous solutions shall be chosen from table 2 in accordance with the process class defined in table 1 for the material used to manufacture the parts.

The parts shall be completely immersed in the chosen solution, then rinsed in clean water and dried.

Table 2

Process class	Solution components g/l		Temperature °C	Time min	Anodic voltage V
	HNO ₃ ¹⁾	Na ₂ Cr ₂ O ₇ , 2H ₂ O ²⁾			
C1	200 to 250	20 to 30	50 to 55	20 to 40	Without
			20 to 30	30 to 60	
C2	200 to 500	-	20 to 30	30 to 60	Without
			50 to 55	2 to 3	
C3*	a)	20 to 30	60 to 70	30 to 40	3 to 5
	b)	-	40 to 60	2 to 3	Without
C4*	a)	20 to 30	50 to 55	20 to 40	Without
	b)	-	40 to 60	30 to 40	Without

* Step a) shall be followed by step b) with a clean water rinse in between.

1) HNO₃ : Nitric acid

2) Na₂Cr₂O₇, 2H₂O : Hydrated sodium dichromate

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9 Required characteristics and inspection**9.1 Parts**

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9.1.1 Appearance

When subjected to visual inspection, the surfaces shall be clean and free from corrosion, pitting or other form of surface attack due to the treatment.

A slight discolouration is allowed.

9.1.2 Absence of iron contamination

Surfaces of type parts or test specimens shall not show any iron contamination indicated by rust after a salt spray test according to ISO 9227 for 2 h.

9.2 Process

9.2.1 Air used for drying or any other operation shall be dry and free from oil.

9.2.2 The iron content in the solutions indicated in table 2 shall be less than 5 g/l and the chloride content less than 0,1 g/l.

The nitric acid and sodium dichromate concentration shall be within the limits indicated in table 2.

Chemical analyses of the solutions indicated in table 2 shall be carried out at regular intervals to determine the contents of nitric acid, sodium dichromate, chloride and iron.